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ABSTRACT

Three known methodological approaches were investigated as to their within-test correlative support in the measurement of a phenomena called imagery. Based on these methodologies, repeated dichotomization of subjects into high and low visualizers was significantly consistent. Moreover, self-reported ratings of imagery vividness of prose were significantly correlated to posttest performance. The prose posttest scores for this induced encoding treatment were superior to the placebo. Theoretical questions dealing with Aptitude by Treatment Interaction (ATI) and mental elaboration, i.e., imagery, as an individualized encoding strategy were discussed. (Author/BJG)

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Differential Imagery Ratings Using Nouns, QMI, Prose and Induced Encoding Strategy

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Introduction:

There are a few highly conventionalized methodologies currently in use which purport to dichotomize individual differences in the cognitive strategy known as imagery. Namely, these methodologies are noun ratings, Betts' Questionnaire upon Mental Imagery (QMI) and prose. The purpose of this study is twofold: first, to compare (through multiple replication) these methodological approaches using correlative support that they are, in fact, examining the same phenomena. The second purpose of the experiment is to dichotomize the subjects (high and low visualizers) on each of these three methodologies and compare their posttest performance on five prose passages. Briefly then, this study attempts to follow the general methodology for blending the correlational and experimental model suggested by Cronbach, i.e., ATI, in discovering the facilitative nature of imagery in instruction.

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Theoretical Framework:

A prerequisite for controlled Aptitude by Treatment Interaction (ATI) studies is a reliable and valid measure of the aptitude in question. In the case of imagery, the search is continuing for the task which will produce some linear correlation. There are a number of studies which report correlative data, but as yet they seem task-specific and non-generalizable. One of the problems in discovering the linear correlate is that the nature of imagery may be multi-aptitudinal, which would account for the variance in research findings reported to date. There are at least three theoretical orientations

which have influenced imagery aptitude definition. The first is a concern for the stimulus characteristics associated with the instructional task, e.g., noun pairs, vividness of events, etc. The second is imagery as a process, which purports that experiences are encoded, stored in memory, and later retrieved through some visual modality. The third orientation suggests that the definition of imagery rests in the reliability of subjects' self-reports. That is, different individuals consistently report vividness of imagery experiences. Using these reports might be useful in the dichotomizing of subjects for the purpose of differential instructional treatments (ATI). A variation of this third approach substitutes subjects' scores obtained on objective tests, e.g., learning in a paired-associate task from a work list, picture list or a combination of both, for subjects' self-reports. Levin (1974) used this method in classifying three types of learners. He then placed them in different instructional treatments for the purpose of further defining an ATI for visual imagery. Whereas Levin used objective student performance results to group his subjects, this study uses subjects' verbal reports of stimuli, i.e., vividness ratings of nouns, QMI and prose.

Until a few years ago, methodologies involving introspection, verbal reports of internal events, and verbalizations of idiosyncratic problem-solving strategies had a small part in explaining the cognitive process needed in the retrieval of information of problem-solving behavior. Recently however, there has been a reemergence of scientific interest involving the subjective verbalization of cognitive processes necessary for information retrieval.

The induced encoding strategy directed half of the subjects to form mental pictures in their mind's eye and, where possible, to combine these images into mosaics for later retrieval. Theoretically, those persons deemed high visualizers, based on the noun, QMI and prose vividness ratings, should

also follow these encoding directions with greater ease (a la Cronbach). Operationally, that was the major intent of this experiment.

The theoretical issues raised in this summary suggest two hypotheses: a) measures of imagery using three independently constructed yet accepted forms of dichotomizing subjects into high and low visualizers, will have significant within-test correlations, and b) high visualizers, as defined by each of the three tests, will benefit more from an induced imagery strategy than will low visualizers.

The hypotheses will be tested by comparing the relationship between the three kinds of tests (subjective noun rating, QMI rating scale and paragraph rating scale) to the performance of the subjects on a task, which is assumed to be facilitated differentially by the induced imagery strategy.

Materials and Procedures:

The 54 word noun list was assembled from the 925 word list generated by Paivio (1968), and represents the entire range of his vividness ratings. A pilot study was undertaken which correlated this shorter list to the original Paivio ratings; this revealed a Pearson Product Moment correlation of .98. This 54 noun list included three words to a page and was counter balanced as to word order. It had printed instructions exactly like the original 925 word list task.

The second measure was the shortened form of Betts' QMI scale which requests the subjects to rate the vividness of seven modalities, each representing a different sensory experience. These seven modalities were: visual, auditory, tactile, kinesthetic, gustatory, olfactory and organic. The response range is on a scale of: "The image is perfectly clear. (1)" to "No image at all. (7)".

The third measure was the subject's image-vividness self-report given after reading each of five prose paragraphs. The rating system used was a

duplicate of the QMI scale. However, while in the QMI the descriptions reported upon were individual words and phrases, the prose paragraph lengths ranged from 100 to 200 words.

The procedure was, first, to administer the noun list and the QMI scale. On the second day the paragraphs with the differentiated instructions were given. Half of the subjects were instructed to construct mental pictures in their mind, as they read the paragraphs. The second half of the subjects were given a placebo. At the conclusion of this reading and vividness rating, a surprise posttest measured the subject's recall on the paragraph.

Data Source:

The study was conducted at Bucknell University and used 98 students enrolled in an introductory course in educational foundations. Though participation was voluntary for the 56 females and 42 males, subjects received credit toward the course grade.

Results:

The correlational results are exhaustive when considering the number of subsets within each of the three self-report measures, as seen in the following list:

1. Noun Rating (total score) (N-TS)
   a) Concrete Nouns (CN) b) Abstract Nouns (AN)
2. QMI (total score) (QMI-TS)
   a) Visual b) Auditory c) Tactile d) Kinesthetic d) Gustatory
   f) Olfactory g) Organic
3. Paragraph rating (total score) (PR-TS)
   a) Five individual paragraph vividness ratings
   b) Five paragraph posttest scores (PT)

In addition, the paragraph ratings and PT scores were influenced by the differential instruction treatment strategy of the imagery instructions and the placebo. Because of the limited space requirement of this summary, only the salient results will be reported (see Table 1).

Table 1 Correlated Noun and QMI Self-Report

Correlated Factors	Correlations	Significance Level
Total nouns/total QMI	-.37	p .01
Concrete nouns/visual QMI	-.41	p .01
Abstract nouns/visual QMI	-.17	n.s.d.

The results reported in Table 1 are of the total number of subjects (N=98). The following results (see Table 2) are dichotomized into the independent variables, i.e., differential encoding instruction: (1) form mental pictures in your mind's eye, and (2) a placebo.

Table 2 Correlations of Differential Encoding Strategy

Correlated Factors	Imagery	Placebo
Paragraph vividness rating/posttest score	-.35*	-.09
Paragraph vividness rating/total noun rating	-.38**	.12
Paragraph vividness rating/QMI total score	.51**	.04
Paragraph vividness rating/QMI-visual	.43**	.14

Note: *(p .05); ** (p .01)

The mean posttest scores (maximum possible was 35) for the encoding strategies were: Imagery 27.3 and the placebo 20.5, which is a statistically significant difference ($F = 17.6$, $df = 1/91$, p .01).

Discussion:

The results of this study confirm the relationship between three known methodologies for measuring the subject's self-report of imagery vividness. That

is, the within-test correlations were significant for the noun ratings, the QMI and the prose vividness ratings. Analyses performed, but not reported here, include the relationship between the concrete and abstract nouns and the seven modalities of the QMI, and each of these data points with the posttest score.

The second finding of importance is the significant posttest mean score difference brought about because of the differential encoding instructions given just prior to the paragraph reading. In addition, there is a confirmed relationship between the paragraph vividness ratings and posttest scores. That is, as posttest scores improved, the vividness rating increased. The interesting point is that the subject's rated vividness unsuspecting of a posttest.

The present investigation suggests two conclusions. First, imagery vividness reports possess construct validity, as indicated by the similar results of the noun and QMI ratings. Second, instructions to form mental pictures during the reading of a prose passage increases the vividness rating of those passages and improves performance on a recall posttest.

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